

## Letters to the Editor



## Comments on "Comparison of changes in the optic nerve sheath diameter following thoracic epidural normal saline injection in laparoscopic surgery"

### TO THE EDITOR:

We read with great interest the article by Kim et al. concerning the changes in Optic Nerve Sheath Diameter (ONSD) following thoracic epidural normal saline injection in laparoscopic surgery (1).

We congratulate the authors for the brilliant idea to measure the ONSD during the injection of normal saline solution in thoracic epidural space to prove the increase in intracranial pressure. Ocular ultrasonography has been employed to identify several ocular and orbital diseases and the ONSD measurement in the diagnosis and follow-up of increased intracranial pressure has been firstly proposed by Karl Ossoinig since last century (2).

However, we would like to comment on some aspects of this paper.

The authors performed an ultrasound B-scan and used a hockey stick probe placed on upper closed eyelid trying to obtain the best orbital axial image in the optic nerve plane. Looking at the picture shown in the paper it is clear that the insertion of the optic nerve in the ocular wall is missing, because there is some orbital tissue between the optic nerve and the globe, making this a paraxial measurement and not a true axial measurement, and this obviously will influence the measurements.

In our opinion the reason for this is the position of the probe over closed eyelids, in this way the identification of gaze position will be very difficult, For this reason we suggest to perform the examination with open eyelids utilizing methylcellulose and anesthetic drops (3, 4).

B scan is very sensitive in detecting small optic nerve calcifications as it happens in cases of optic nerve drusen (5) but is not so reliable in case of measurements (6).

Among the reasons for this poor reliability there is that with B scan the optic nerve is visualized as a low reflective band behind the globe. This makes the measurement very difficult: the borders of this structure are blurred due to the scattering of the ultrasounds waves that reach the structure in a non-perpendicular way, moreover the width is influenced by the so called "Blooming effect" related to the acquisition gain (7-10). With low gain the ONSD will appear larger due to the decreased wall brightness, and the opposite with high gain. The lack of a standardized setting of acquisition will make the measurements unreliable, as even an error of few microns could impact the evaluation of a small structure such as the optic nerve (11,12).

For this reason, in case of future studies, we suggest using the Standardized A Scan: it shows easily noticeable hyperreflective spikes from the interface between arachnoid and subarachnoid fluid and results in objective measurements, so being a blooming effect-free ultrasound technique (13-15).

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